

SECTION 612 PAINTS AND PAINTING

612.01 DESCRIPTION. This work is the surface preparation, furnishing and applying the paint, and protecting the paint coatings, pedestrians, vehicular, or other traffic upon or under the surface being painted.

612.02 MATERIALS. Furnish materials meeting the applicable requirements of Section 710 and 612.02.1.

612.02.1 Coating System for Structural Steel. Furnish a complete coating system consisting of a self-curing zinc-rich primer, an intermediate coat of high-build epoxy paint and a protective top coat of urethane paint meeting Subsection 710.02.3 © requirements. The epoxy color must be white and the urethane color is specified in the Contract.

612.03 CONSTRUCTION REQUIREMENTS.

612.03.1 Coating Systems for Structural Steel. Submit a written description of the coating system to the Project Manager for approval at least 30 days before starting work.

Include in the written submittal the manufacturer's product information including but not limited to paint characteristics, surface preparation, film thickness recommendation, safety data, repair procedures and application recommendations.

Bring conflicts between the coating system submittal and the specifications to the Engineer's attention for resolution.

Furnish the services of a paint or painting technical representative from the paint manufacturer at the beginning of paint operations and as required during operations.

Shop apply the primer. Shop or field apply the intermediate and top coat. Protect all coats from damage during handling, transporting, and unloading. Repair all paint damage following the coating manufacturers recommendations at Contractor expense.

612.03.2 Protection of Structure, Persons, and Property. Protect pedestrian, vehicular, and other traffic upon or under the structure, the super-structure and substructure against damage or disfigurement by spatters, splashes, smirches, or over-spray of paint or paint material. Clean and remove all paint damage at Contractor expense.

A. Pollution Controls. Prevent environmental pollution including stream and air pollution caused by paint, paint spray, paint chips, dust, or other harmful materials meeting all Federal, State, and local regulations and requirements.

612.03.3 SURFACE PREPARATION. Prepare surfaces to be painted following the paint manufacturer's recommendations, or the following, whichever is most restrictive.

- A. Structural Steel for Bridges.** Clean oil and grease from surfaces to be coated before blast cleaning. Solvent clean oil or grease coated surfaces to meet SSPC-SP 1 requirements.
- Surface clean by the centrifugal wheel or the air blast method. Blast clean meeting SSPC SP-6, Commercial Blast Cleaning requirements.
- Hand-clean the steel bridge bearing components containing PTFE (polytetrafluorethylene), stainless steel surfaces, and neoprene pads to prevent surface damage.
- Remove fins, tears, slivers, and burred or sharp edges by grinding and re-clean the area as specified before coating.
- Remove blast residue from steel surfaces with clean brushes, compressed air, or a commercial grade vacuum cleaner equipped with a brush-type cleaning tool, or by double blowing. Keep steel dry, dust free and prime steel within 24 hours after cleaning.
- Clean structural steel that is not shop painted to meet SSPC SP-7 requirements after erection. Guard angles, pier nose angles, deck expansion joints, and other small structural steel elements may be prepared for painting using wire brushes, scrapers, chisels, or sand blasting as approved.
- B. Galvanized Metal Surfaces.** Treat galvanized metal surfaces to be painted using phosphoric acid solutions of the zinc phosphate and phosphate chromate types formulated for this use. Dry the treated surfaces 20 minutes, then rinse with water. Begin painting within 24 hours.
- C. Previously Painted surfaces.** Clean to meet SSPC SP-7 requirements.
- D. Steel not to be painted.** Steel may be cleaned before or after erection.

612.03.4 REMOVING LEAD BASED PAINT.

- A. Pre-qualification.** Submit a work plan, that meets OSHA and EPA regulations, as a pre-qualification for lead paint removal work at least 20 days before the bid letting date. Address the work plan to: Construction Engineer, Montana Department of Transportation, 2701 Prospect Ave., Helena, MT., 59620.
- Work plans will be reviewed for acceptance within 5 working days of receipt. The Department will notify the Bidder in writing of the plans acceptance or rejection. Rejected plans may be re-submitted once only and must be received by the Department at least 5 working days before bid letting to be considered for acceptance. The approved work plan of the successful bidder becomes a part of the contract upon award.
- B. Work Plan.** Have the work plan prepared by an individual who has experience with, and worked under, OSHA and EPA regulations and will supervise the work covered by the plan. Include the individuals resume listing qualifications, experience, and references.
- Work plans consisting only of copies of specifications and regulations will be rejected.
- Address the following items in the written work plan:
- 1. Worker Protection.** Meet the OSHA lead standards of Title 29, CFR 1926.62. Describe medical surveillance, exposure monitoring, respiratory protection, personal hygiene, employee training, employee

access to records, hazard communication and a compliance program to reduce lead exposure to within the Permissible Exposure Limits (PELs). Exposure monitoring must meet NIOSH Method 7082.

Provide the Engineer copies of pulmonary capacity tests, copies of employee training certificates, and the blood test results from all workers involved in the paint removal. Take one test before beginning work, then every 4 weeks thereafter until the work is complete. The Engineer may adjust the frequency based on the tests results. Take the final blood test within 2 weeks of completing the paint removal.

- 2. Environmental Protection.** Design a containment system meeting SSPC 1,2 or 3 " Guide for Containing Debris Generated During Paint Removal" requirements except that permeable wall materials cannot be used. The containment system may be located on or off the project site. Submit shop drawings and design calculations for containment systems attached to the structure . Include design calculations that address all load conditions on the structure resulting from the containment system including debris. Specify ventilation and negative pressure equipment capacity, layout, and related calculations.
- C. Air Quality.** Test and monitor air quality for particulate and lead matter under Part 40 CFR 50. Sample air quality before construction for background particulate matter. Monitor air quality during construction until four consecutive samples show emissions not exceeding $400 \mu\text{g}/\text{m}^3$ of PM_{10} over a 8-hour period. If emissions exceed $400 \mu\text{g}/\text{m}^3$, stop work until the containment system is corrected to meet the required air quality level. Use high volume monitors placed upwind for background levels and downwind of the work and near the right of way line for monitoring emissions.
- Sample air quality for lead before and during construction. Test background levels before construction by placing the monitor upwind of the project.

Take 4 consecutive samples when construction starts from monitors placed downwind and near the right of way line to determine emission levels. The maximum allowable emission in an 8 hour period is calculated by the following formula:

$$AE = 90/PD \times 1.5 \mu\text{g}/\text{m}^3 \times 3$$

Where: AE = 8-hour allowable emission in $\mu\text{g}/\text{m}^3$
PD = Project duration in days

The Maximum and minimum value for PD is 90 and 30 respectively.

Stop work when samples exceed the allowable AE until the containment system is corrected and emissions fall within the acceptable limits.

- D. Soil Quality.** Do not contaminate the soil with lead. The Department will take soil samples before and after construction for contamination testing. The Contractor is responsible for all work and costs to restore the soil to the condition represented by the pre-construction sample.
- E. Water Quality.** Do not contaminate any water system with lead debris (spent abrasive, paint chips, etc). The Department will take sediment

samples below and downstream of the project before and after work begins for contamination testing. The Contractor is responsible for all work and cost to restore the water system to the condition represented by the pre-construction sample.

- F. **Disposal.** Contain and store the material meeting the approved plan. The Department is responsible for disposal.

612.03.5 APPLICATION OF PAINT.

- A. **General.** Do not paint when weather conditions would cause unsatisfactory work. Follow the paint manufacturer's recommendations for surface temperature and dewpoint/temperature requirements. The Project Manager may stop painting at any time if current or impending weather conditions could cause unsatisfactory coating performance.

Correct failures or damage to new painted surfaces at Contractor expense. Provide a minimum dry film thickness of 1.5 and 1.0 mils (35 μm and 25 μm) respectively for each primer and succeeding field coat of paint over metal unless the paint manufacturer recommends otherwise.

Provide the inspectors ready and safe access to the work at all times. The Project Manager will suspend work for unsafe or inadequate access facilities. Assure all fabrication inspections are complete before beginning painting.

- B. **Painting Structural Steel.**

1. **Application.** Apply 3 coats of paint to all new structural steel. This includes but is not limited to steel and metal structures such as bridge rail, sign posts, and sign structures exposed to the weather. Paint in a neat and workmanlike manner.

Follow the paint manufacturer's recommendation when brush or spray painting to produce a uniform, even coat to the metal or previous paint coat. Brush paint thoroughly coating the surface irregularities and brush out and smooth to produce an even paint film thickness. Equip spray pressure tanks with an agitator that thoroughly stirs the paint.

Stir the paint as recommended by the manufacturer before removing it from the containers and during application. The Project Manager may approve hand mixing when each coat of paint is 5 gallons (20 L) or less.

Follow the manufacturer's recommendations for paint thinning.

Paint surfaces inaccessible to paint brushes with sprayers or daubers made for that use.

Protect painted surfaces from adverse weather until the paint has dried or weather permits removing the cover.

Remove and replace unsatisfactory paint work at Contractor expense.

2. **Shop Paint.** Apply one coat of zinc rich primer to all metal surfaces, except surfaces in contact after erection. Apply the shop coat immediately after the fabrication, shop inspection, and shop cleaning are complete and the work has been accepted.

Do not paint metal surfaces that are in contact with other items after erection except as specified in Subsection 612.03.5(C)(1). Do not pack

or ship materials until the paint is dry. Field coats may be applied in the fabrication shop only if approved in writing by the Engineer.

Make erection marks for the field identification of members on painted surfaces. Assure erection marks, fabricator's name, or other identification does not show through the final coat of paint. Use marking paint that is compatible with the shop coat and first field coat.

Shop coat machined-finished surfaces, excluding abutting chord splices, column splices, and column and truss shoe bases as soon as practical after acceptance with a zinc-rich primer coat. Machine finished iron and steel casting surfaces to remove scales, scabs, fins, blisters, and other surface deformations must be painted with a zinc-rich primer.

3. **Field Cleaning.** Remove all rust, scale, dirt, grease, unacceptable shop paint and other foreign material following the paint manufacturers recommendations when erection work is complete.

4. **Field Painting.**

- a. **Application Conditions.** Apply paint following the manufacturers recommendations for temperature (air, surface, material), relative humidity and substrate temperature or as follows, whichever is more restrictive.

Do not apply paint when the ambient temperature is 40 °F (5 °C) or is expected to drop below 40 °F (5 °C) within 2 hours of application.

Do not apply paint when rain, snow, or condensation is expected within two hours after application at the painting location. The Project Manager may stop paint operations when impending weather could harm freshly applied paint. Do not apply paint when the relative humidity is greater than 85% or when temperature and humidity cause condensation on the surface to be painted.

Do not apply paint to metal with surface temperatures that exceed 110 °F (40 °C) or when the surface temperature causes the paint to blister or produce a porous paint film.

- b. **Accessory Preparations and Spot Painting.** Thoroughly clean masonry and sole plates, the outside faces of end floor beams, the bottom of expansion devices, and all parts of steel work inaccessible for painting after erection of all foreign material. Spot coat and apply two field coats. Perform the painting on site and allow it to thoroughly dry before assembling. Handle painted material to prevent paint damage. Repair and repaint damaged surfaces at Contractor expense.

Apply the primer shop coat only to the exposed surfaces of bridge deck guard angles, approach slabs, expansion devices, and armored joints embedded in the roadway surface. Apply two coats of field paint to the entire curb or sidewalk portion of these members as specified elsewhere in this Section.

After erection and field cleaning is approved, apply the spot coat to the edges of the plates, rolled shapes and angles, to the heads of all field rivets, pins, nuts and areas where the shop coat has been damaged. The Project Manager may require a complete

shop coat reconditioning or replacement on damaged surfaces at Contractor expense.

Re-seal small cracks and cavities left by the first coat with a zinc paste before applying the second field coat.

- c. **Field Coating.** Once the field cleaning is complete and the spot coat is thoroughly dried, apply one field coat of epoxy paint to all metal and the finish coat of urethane paint. Do not apply the urethane until the epoxy has dried as recommended by the paint manufacturer.

- d. **Painting Season.** Field painting season for structural steel, metal posts or poles, and bridge rail is from May 1 to October 31, unless otherwise approved in writing by the Project Manager.

C. Painting Bridge Rail.

- 1. **Metal Bridge Rail.** Prepare metal bridge rail to be painted meeting the applicable requirements of Subsection 612.03.3.

Apply the spot coat and the first and second field coats before erection and fit-up to the following contact surfaces:

- a. Rail to post contact surfaces;
- b. Bridge rail expansion sleeves;
- c. Bridge rail post base plates.

Apply the first and second coat to the rest of the rail after erection, fit-up, and final adjustment of the rail to line and grade.

Repair coating damage to galvanized members with an approved zinc-rich paint.

- 2. **Wood Rail and Posts.** Primer and paint for wood rail and posts are specified in the Contract. Apply paint meeting the applicable requirements of Subsection 612.03.05.

612.04 METHOD OF MEASUREMENT. Paints and painting is not measured separately but is incidental to the items being painted.

612.05 BASIS OF PAYMENT. Paints and painting is not paid for separately but is included in the cost of the item painted and includes all materials and resources necessary to complete the work.